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Iron Deficiency in Bangladesh

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Executive Summary

Iron deficiency, the most prevalent micronutrient deficiency in the world, affects more than 2 billion people. In Bangladesh it affects about half of all children and more than 70 percent of all women. The main cause of iron deficiency in Bangladesh is chronic inadequate dietary intake. This low iron intake has been attributed to many factors, including poverty, diets low in iron and rich in anti-nutrients, and hookworm infestation. Indeed, because the Bangladesh diet is dominated by consumption of polished rice, a poor micronutrient source, the population suffers from multiple micronutrient deficiencies.

Various interventions exist to address iron deficiency, including fortification, supplementation, dietary diversification, and biofortification. Specialists do not intend these interventions to be independent iron deficiency alleviation tools, but rather approaches to be administered in a mix as required, as well as tools to be used in combination with non-nutritional measures such as poverty reduction interventions. They are administered to target groups according to their needs. These interventions have been implemented with mixed results in both the developed and the developing world. Before an intervention is implemented in Bangladesh, however, policy makers need to address issues such as whether to implement a targeted intervention, a national intervention, or both. In addition, they must decide whether iron is the only micronutrient they want to target, given that the population suffers from multiple micronutrient deficiencies. Whatever the intervention or set of interventions chosen, addressing the gap between what is desirable and what is feasible will present a challenge, given the facts on the ground.

Your assignment is to recommend an appropriate government intervention to reduce iron deficiency in low-income people in Bangladesh.

Background

The Prevalence of Iron Deficiency

Iron deficiency is the most prevalent micronutrient deficiency in the world. It is more prevalent in developing countries (30–70 percent) than in the developed world (<20 percent). Iron deficiency affects more than 2 billion people in the developing world (ACC/SCN 2000). It is also an important contributor to anemia, which occurs when a person has a deficiency of red blood cells or hemoglobin, or both. Anemia may be caused by excessive bleeding, inadequate production of red blood cells, or excessive destruction of red blood cells. Many nutrients are needed for the production of red blood cells, and the most critical are iron, vitamin B_{12}, and folic acid. When anemia is accompanied by evidence of iron deficiency, it is called iron-deficiency anemia (IDA). About half of the preschool children in developing countries are anemic (Hunt 2002). It is thought that most of the anemia in developing countries is due to inadequate iron intake.

Iron deficiency is most prevalent in South Asian countries (Zlotkin et al. 2004). Bangladesh has an iron deficiency prevalence of about 58 percent depending on the indicators used, and 70 percent of all women in Bangladesh are anemic (Ahmed 2000). Bangladesh loses 2 percent of its gross domestic product to iron deficiency (Ross and Horton 2000). A study by the Asian Development Bank (ADB) and the United Nations Children's Fund (UNICEF) in low-income Asia estimated that productivity losses from IDA are 17 percent for workers engaged in heavy physical labor and 5 percent for moderately active workers (Horton 1999). Iron deficiency affects two main groups: young children and women of child-bearing age (Yip and Ramakrishnan 2002; Zlotkin et al. 2004).

The main causes of iron deficiency are inadequate iron intake, inhibited iron absorption, loss of blood, and increased nutritional demand. Inadequate intake of dietary iron, in quantity and quality, is the primary cause of iron deficiency in developing countries. One major reason for inadequate iron intake is a diet consisting of poor iron sources. For instance, it may be low in animal and fish products, fruits, lentils, and green leafy vegetables. Poverty is the major factor contributing to an iron-poor diet. It is well known that the proportion of the contribution of cereals to household diets is inversely related to the household's economic status. Staple foods account for 80 percent of total per capita energy intake in Bangladesh, partly because of the alarming upward trend in nonstaple food prices.

The second cause of iron deficiency is inhibited iron absorption. There are two forms of iron: heme and nonheme iron. Heme iron is the most bioavailable. Nonheme iron is available in two states—ferrous (Fe II) and ferric (Fe III)—of which ferric iron is more bioavailable. Heme and nonheme iron are absorbed differently into the body, and the factors in the bioavailability of each are thus different. There are no known factors that affect heme iron bioavailability except its conversion from heme to nonheme form during cooking. On the other hand, nonheme iron bioavailability is dependent on the presence of iron absorption enhancers and inhibitors. Iron enhancers are biochemicals, such as ascorbic acid, that promote iron absorption. Iron inhibitors are those that limit iron absorption by binding iron, such as phytates, certain polyphenols, and oxalic acid. Inhibited iron absorption may be caused by the consumption of diets containing high levels of antinutrients like phytates in cereals and vegetables; polyphenols in tea, coffee, and cocoa; and casein in milk or by diets low in iron absorption promoters, such as vitamin C.

Red blood cells, which make up 40–45 percent of a person's blood, contain iron. Blood loss—from, for instance, heavy menses or infestation by a parasite like hookworm—is thus an important cause of low iron status. Diseases such as malaria and diarrhea are also known to cause iron deficiency. Malaria causes iron deficiency by destroying erythrocytes, and diarrhea causes excessive loss of minerals from the body. Parasites have two iron-reducing effects: first, they feed on the host's nutrients, and second, they cause blood loss.

Finally, increased nutritional demand may be a result of one or more of the above factors. It usually is the case in pregnancy and during the rapid growth of early childhood.

The Bangladesh diet is dominated (about 80 percent) by rice (Hels et al. 2003) and contains vegetables and lentils. Polished rice is a rich source of dietary energy but a poor source of vitamins and minerals. Because meat, poultry, and fish are expensive, resource-poor households do not consume enough of these foods. The availability of seeds for suitable varieties of summer vegetables, the adoption of appropriate agronomic practices, and the expansion of marketing facilities have increased vegetable production and smoothed out its seasonality, although most vegetables are grown in larger quantities during the winter season. Consumption of fresh vegetables may thus increase a bit during the winter months. In addition, vegetable consumption declines marginally with income decreases (Bouis et al. 1998). The Green Revolution has been successful in increasing rice yields such that, after adjusting for inflation, the price of rice has fallen by 40 percent since the mid-1970s, making it more affordable—particularly to the poor. On the other hand, the prices of pulses and meat have doubled since the mid-1970s.

Iron Deficiency Interventions

Interventions for iron deficiency include fortification, supplementation, public health measures, dietary diversification, and biofortification. Although these interventions have been implemented in both developed and developing countries, iron deficiency alleviation has been more successful in developed countries, perhaps because interventions began sooner there and because these countries may have more homogeneous socioeconomic environments.

Fortification. Food fortification is the addition of nutrients to foods with the aim of providing a nutrient or nutrients lacking in the diets of communities consuming the food. The effectiveness of this intervention depends on the quality of the fortifier, the frequency of use, and the nutritional value of the fortified product. Ferrous sulfate is the least expensive iron fortifier, and it is also highly bioavailable. It reacts with some food components, however, affecting taste and product shelf life. For a population to benefit from fortification, it needs to have both physical and economic access to fortified products. Availability of commercially fortified foods is limited to those who can afford to purchase them. It is therefore important to find the right fortification vehicle. In Bangladesh this is a challenge because one-fifth of the population is ultra poor and does not have adequate purchasing power. Even if this challenge were somehow overcome, the challenge of coordinating decentralized processing of the food product, especially in rural areas where food processing is informal, would remain.

Supplementation. Supplementation is an effective way to reduce micronutrient malnutrition in a targeted population. Because it is estimated to be more costly than fortification, it is administered to

targeted groups. Supplementation, like fortification, has the advantage of supplying more than one micronutrient at a time. The more micronutrients included in a supplement, however, the higher the cost. This is a major reason why most national supplementation interventions just meet minimum requirements. In the case of iron supplementation, the minimum requirement consists of an iron and folic acid supplement. Yet the increased cost of adding extra nutrients to supplements is minimal compared with the high cost of delivering and distributing the supplement, whether a single- or multiple-nutrient version. Given the fact that the Bangladesh population suffers from multiple deficiencies, it seems necessary to address many deficiencies at once. The good news is that this is possible. The issue of the sustainability and effectiveness of this approach in reaching vulnerable populations has been raised.

Biofortification. Biofortification is defined as the process of breeding food crops that are rich in bioavailable micronutrients (Graham et al. 2001; Bouis 2003). Three approaches are currently being considered to increase iron bioavailability in cereals: increasing iron accumulation in edible plant parts, reducing the content of inhibitors, and increasing iron absorption enhancers. These approaches may be implemented independently or as a mix. The Green Revolution was successful in alleviating energy and protein malnutrition, especially through increased rice production and reduced rice costs in Bangladesh. Biofortification has been considered the "second Green Revolution." This strategy may close the gap between iron intakes and requirements, and hence alleviate iron deficiency in Bangladesh. Biofortification, as a strategy, takes advantage of the fact that most of the poor are smallholder farmers who consume mainly what they grow.

Dietary diversification. Dietary diversification takes the approach of correcting nutrient intake by encouraging the use of nutrient-rich sources. It hence has an educational and agricultural component. The best method for alleviating malnutrition is to ensure that the available diet is adequate in every nutrient. This long-term goal requires access to adequate foods and appropriate dietary habits. Poverty levels and household food insecurity are high in developing countries, so many people are not even able to meet their calorie, let alone micronutrient, requirements. In addition, successful promotion of dietary diversification requires a behavioral change in food selection, food production and purchase, food preparation, and food consumption. Finally, because of the different components of dietary diversification, a multisectoral approach is required.

Public health (disease and infection control). The public health "intervention" related to iron deficiency prevention and control most often consists of linkage. The intervention links various efforts related to reducing IDA to relevant public health efforts, including disease and infection control. Disease and infection control aims at lowering iron demand by eradicating parasite infections and diseases, such as malaria. Micronutrient malnutrition is often associated with poor nutritional status and infection. Therefore public health measures that include disease and infection control, improved water and sanitary conditions, and child care and maternal education must also be taken into consideration.

Policy Issues

Substantial research and development (R&D) have taken place on the feasibility and potential of iron-deficiency interventions in developing countries. Research shows that it is possible to significantly alleviate iron deficiency. Yet why hasn't more been done to close the gap between people's iron requirements and their iron intake? According to Yip, an authority in iron deficiency, it may be because of a "lack of effective communication [by R&D] to policy makers about the importance of iron deficiency. Another reason may be that although the general strategies for iron deficiency prevention and control are well defined, the operational feasibility of these strategies in different settings has not been adequately evaluated and is not an effective area of research"(Yip 2002, 803S). It is not clear which of these reasons play a significant role in Bangladesh. Bangladesh should work to determine the causes of the gap, so it can respond effectively.

Young Children and Women of Child-Bearing Age

Young children and women of reproductive age are the most affected by iron deficiency (Stoltzfus 2001; Yip and Ramakrishnan 2002). Optimal

solutions for children, however, may not apply to women. Iron deficiency commonly develops in young children of between 6 and 24 months because their iron requirements are highest during this time. The high prevalence of iron deficiency in children of this age is accounted for by limited iron stores at birth, timing of umbilical cord clamping at birth, timing and type of complementary food introduction, and frequency of infections (Zlotkin 2002). The incidence of iron deficiency for this age group in developed countries is not high mainly owing to better diet quality, fortified infant formula, and the availability of processed complementary foods. The recommended interventions at this age are supplementation (in syrup form before 12 months of age) and commercially fortified infant cereals. The food mainly offered to Bangladeshi children is plain parboiled rice. A new intervention, "Sprinkles" (a fortified powder), is currently being introduced in Bangladesh. "Sprinkles" allows for in-home fortification of normal complementary foods.

Kimmons et al. (2004) carried out a study to determine the feasibility of improving complementary feeding practices and micronutrient intake of infants in rural Bangladesh. The results showed that rural Bangladeshi women know that adding vitamins and minerals to an infant's diet is the healthy option, but they stated that they could not afford fruits, eggs, fish, and meat. In addition, the mothers preferred the rice and dhal diet to the other five intervention diets provided, which included the addition of an oil-based mineral supplement. The study concluded that it is possible to change the child-feeding behaviors of mothers for a short time to promote increased food intake, meal frequency, energy density, and micronutrient consumption, but it is not clear if the short-term behavioral changes are sustainable.

Iron deficiency in women is associated with preterm delivery, low birth weight, perinatal mortality, and in the case of severe anemia, maternal death (Hyder et al. 2004). For women of reproductive age, iron deficiency is due to blood loss and poor diets that have low iron content or bioavailability. The onset of pregnancy increases the probability of iron deficiency because pregnant women require two to three times the iron that nonpregnant women do. It is thought that dietary factors make a greater contribution to the high prevalence of iron deficiency in developing countries than does blood loss (Yip and Ramakrishnan 2002). Vegetables are the main source of micronutrients for most Bangladeshi women because they cannot afford fruits and meat. Vegetables are seasonal, however, and make up a small portion of the household diet. The quality and content of noncereal foods in a Bangladeshi household are directly proportional to its income. Therefore women, like children, suffer from multiple micronutrient deficiencies. In addition, hookworm infestation may cause significant additional blood loss.

Which Interventions?

Four interventions—dietary diversification, fortification, supplementation, and public health—are in use. Does it make more economic sense to focus on just one? If so, which one? Biofortification, a relatively new intervention tool, has been proposed as a better intervention for developed countries. Should Bangladesh consider this intervention? If so, how would it go about it? Finally, which strategy is the most cost-effective?

Over the years developing countries, including Bangladesh, have borrowed and implemented interventions from the developed world. Although Bangladesh has achieved some success with pilot projects, nationwide projects do not exist. Would Bangladesh benefit more from borrowing from other developing-country intervention plans, such as rice fortification in the Philippines? Or should Bangladesh customize its own intervention strategy?

Rural versus Urban Interventions

Once the intervention has been established, implementers need to decide whether they will focus on rural or urban areas. If they address both areas, does the same intervention or set of interventions have the same effect in both? Or, for example, would it make most sense to promote biofortification in rural areas and fortification in urban areas?

The Nontarget Population

As already alluded to, micronutrient deficiencies are prevalent in the Bangladesh population. Although little research on iron deficiency in the nontarget population has been carried out, it is evident that chronic inadequate food intake affects a large proportion of the population. As such, it may be necessary to provide iron and other micronutrients to the whole population.

Major Stakeholders

The Target Population

The target population for iron deficiency intervention projects consists of young children and women of child-bearing age. Males in very poor countries are also iron deficient but are rarely a target group. Each target group has unique requirements. Because children can neither vote nor create pressure groups, they require the assistance of their primary care providers—mothers. In addition, organizations like UNICEF that voice the rights of children may need to assist mothers. At the same time, women need better nutrition options, not only for themselves, but also for the rest of the household. In the face of abject poverty, it seems necessary to have free and heavily subsidized interventions for this population. Finally, the ultimate mix of interventions may need to address deficiencies of additional micronutrients such as vitamin A and zinc. Women of child-bearing age also have an obligation to try and lift themselves from their poor nutritional status. One way may be through money-making projects and diversified home gardens.

The Nontarget Population

Micronutrient overload may be a concern for the nontarget population, but it is not likely to be a public health concern in Bangladesh at the moment. Depending on the intervention chosen, however, the nontarget group may lose out. If the interventions are directed only at women and children, then it is possible to have an iron-deficient male population in the long run. Hence the option implemented should focus on the whole household. Although Bangladesh has made great efforts to include women in development, men remain key decision makers. For successful grass-roots implementation of interventions, women need to be involved in the process.

Health Care Providers

Bangladesh has implemented iron supplementation for women, but there are not enough health care centers and providers for the population. Some areas do not have adequate infrastructure to support health care, and others lack providers. These are common problems in developing countries: the lack of health care centers stems from a limited resource base, and the lack of health care providers is related to brain drain. Brain drain is a function of the low wages paid to health care providers and the existence of options for a better lifestyle.

The Food Industry

The food industry has played a major role in significantly reducing the level of iron deficiency in the developed world and has the potential to do the same in Bangladesh. A company's board has a moral obligation to make profits for its shareholders, and unless the company can benefit from increased profits or a "good corporate citizen" label, a board has no incentive to eat into the company's profits by providing more value. Bangladesh may tap into the food industry's potential by demanding fortification of foods with iron or by providing incentives for the fortification of foods. For example, the government may allow a food company to take advantage of reduced taxes and tariffs when it fortifies products. In the case of a nonfood company, similar incentives may be given for contributing toward food fortification programs. Ultimately, efforts to reduce poverty in the country will increase the population's purchasing power, allowing them to pay for more nutritious foods.

The Pharmaceutical Industry

The pharmaceutical industry in India is a leader in the production of generic products that are affordable to its population. In fact, many of their products have found markets in Africa. Bangladesh could gain by following India's example, which may lead to production of more affordable supplements and deworming medicine.

The Government

The Bangladeshi government has made progress in reducing population growth, reducing child mortality rates, and mainstreaming women into the development process (IFPRI et al. 2005). In addition, since the 1974 famine, the government has moved toward achieving national self-sufficiency in grains, showing that it is dedicated to improving the living conditions of its population. But Bangladesh still faces major challenges. More than 40 percent of the population cannot afford an adequate diet, and one-fifth is classified as ultra poor. These conditions have led to a high

prevalence (50 percent) of stunting and wasting in children. To address malnutrition in Bangladesh, the government recognizes the need to reduce poverty. In a food policy seminar, Minister for Finance and Planning Saifur Rahman said, "Only economic development will eventually be able to give [food] security and economic development as a total development process—not a directed one" (IFPRI et al. 2005, 36).

The country's nutritional status is an indicator that iron is not the only micronutrient in which the population is deficient. Any interventions taken to alleviate iron deficiency must consider this fact and must be accessible to the poorest segment of the population. As the government addresses the long-term goal of poverty alleviation, it may want to consider options for alleviating micronutrient deficiencies, including iron deficiency, that are possible in the face of poverty. Such options may include improving resource-poor households' access to food in ways that do not require economic access.

Agricultural R&D Institutions

Bangladesh is a least-developed country and as such is exempt from some World Trade Organization (WTO) rules on tariff reduction, export subsidies, and domestic support for agriculture. In line with this exemption, the government has increased its expenditures on research on high-value crops for export, with particular emphasis on fisheries, livestock, and forestry. The private sector is more involved in researching and producing noncereal, high-value crops such as vegetables and other horticultural crops for export. Given that there is increased demand for rice but little outlet for research results on that crop, the national price of rice continues to rise, although at a slower rate than prices for pulses, fruits, vegetables, and fish. In the long run the diet quality of the poor will continue to deteriorate because of rising prices. Bangladesh's agricultural research capacity has declined over the years as qualified and experienced researchers are drawn away by opportunities abroad. It is the case, however, that a major portion of the research budget is spent on overhead and salaries for an increasing number of research support staff, meaning a relatively smaller proportion of budgetary resources are available for research work per se.

Bangladesh currently has 41 institutions involved in agricultural R& D (Beintema and Kabir 2006) and working to improve agricultural productivity. These institutions include agricultural research institutes, university units, and small organizations. In 2002, 40 of the agencies spent a total of 179 million international dollars on agricultural R&D (Beintema and Kabir 2006). Three institutions of particular interest are described here.

The Bangladesh Agricultural Research Council (BARC). Established in 1973, BARC was created to coordinate agricultural research activities. Its mandate has since been broadened to encompass planning, coordination, and implementation of agricultural research strategies. In 2002 BARC and its affiliated institutes accounted for more than three-quarters of the country's total agricultural spending. BARC has three main components:

1. A governing board that comprises representatives of ministries, agricultural universities, nongovernmental organizations, the private sector, and farmer groups; this component is responsible for policy formation and research planning and coordination.
2. An executive council that comprises the executive chairman, 7 divisional directors, and the heads of the 10 affiliated research institutes; the 7 divisions are responsible for identifying problem areas, setting priorities, examining research proposals, reviewing research outputs, monitoring and evaluating activities, and conducting human resource development in the institute; the executive council assists the governing board in policy-related activities such as approving research programs.
3. A secretariat that is responsible for implementing policies and guidelines of the governing board.

BARC is affiliated with the Consultative Group on International Agricultural Research (CGIAR). It leverages this link to collaborate with a wide range of international agencies in the CGIAR system and its partners. In addition, BARC affiliates collaborate with other research agencies in India, Nepal, Pakistan, and the Philippines, either directly or through the Asia Pacific Association of Agricultural Research Institutes (APAARI).

The Bangladesh Agricultural Research Institute (BARI). BARI is the largest agricultural research institute in Bangladesh (Beintema and Kabir 2006). It conducts research on many crops, including cereals, tubers, pulses, oilseeds, vegetables, fruits, spices, and flowers. It has three branches: research, support services, and training and communication. Its research is focused on improved crop varieties, management technologies, pest control methods, farm machinery, and postharvest practices.

The Bangladesh Rice Research Institute (BRRI). The BRRI, the country's second-largest agricultural agency, focuses on all aspects of rice development. Its main focus has been on increasing yield.

Policy Options

The Green Revolution was successful in reducing protein-energy malnutrition in Asia through higher-yielding varieties of rice and wheat, which had a positive impact on cereal supplies and farmer incomes. The downside is that boro rice, the major rice crop grown in winter using irrigation, diverted land from pulses and oilseeds because these crops, with their very low yields, could not compete with boro rice in terms of returns to farmers. Thus these commodities are limited in supply, face increased consumer demand due to population growth, and are experiencing rising prices. It is thought that "a recast Green Revolution directed toward dietary quality may be the key" to reversing productivity losses from iron deficiency (Hunt 2002, 749S). Also, varietal improvement in pulses and oilseeds is essential. Given that the Bangladesh population is deficient in more than one micronutrient, whatever the intervention, multiple nutrient interventions are far better than monovalent approaches.

Targeted Interventions

Bangladesh may choose to address iron deficiency by directly targeting children and women of childbearing age. In so doing, the country would move away from a one-size-fits-all approach. One option is to distribute supplements to pregnant women and to postnatal women and their young children. As it is, iron tablets are sold together with birth control pills. Iron supplementation for young children in the weaning stage may take the form of a mix that is added to their diets. The limitation in this approach is the assumption that the vulnerable group has access to health care and that adequate infrastructure for such an operation exists even in the rural areas. Bangladesh may therefore choose to distribute these supplements in health centers in the urban areas and opt for mobile clinics on market days in the rural areas. Then there will be the question of who should pay for the supplements. If the targeted group is to pay, then the ultra poor may not be able to afford it. If the supplements are free, then the system may be abused. In addition, there will be additional costs of monitoring the system to ensure that only those who require supplements take them. The solution may lie in the introduction of a mix of national and targeted interventions. Only the severely iron-deficient would get the supplements, and the rest of the population would gain from a national program or programs. This way, funding supplementation only for a small proportion of the population may be more feasible. If there is an income-dependent cost-sharing plan, then the population may subsidize some of the program.

As already mentioned, many mothers know that adding foods rich in vitamins and minerals to infants' diets is the healthy option, but they cannot afford it. Bangladesh may choose to subsidize these foods for expectant women and families with young children. One way may be through food stamps for groups that meet certain criteria. Given the fact that a large population is considered ultra poor, however, this option may not be feasible. The alternative is to distribute free or subsidized vitamin and mineral premixes that may be added to food or drink. In addition to the recommendations described, Bangladesh may want to consider reinforcing its family planning programs to reduce unplanned pregnancies and increase the monitoring of expectant mothers for micronutrient deficiencies.

National Interventions

It is possible to alleviate micronutrient deficiencies nationally, as has been done in the developed world. One national-scale success in developing countries, especially in East Africa, has been the alleviation of iodine deficiency through salt fortification. Salt, however, is an affordable food ingredient that is deemed necessary in most cultures. Adding iron to salt may be an option for Bangladesh, but studies show that there might be a color and taste change associated with this measure.

An alternative is to fortify rice, the staple commonly consumed in Bangladesh. This approach raises two challenges. First, it is common in all rice-eating communities to wash rice before cooking it, but washing fortified rice is counterproductive. Second, it will be difficult to manage a decentralized rice-milling industry and to equip the many rural mills in the country with the capacity to fortify rice. Failure to achieve this goal may lead to an iron overload in some segments of the population and a lack of iron fortification in others.

Biofortification of rice may be the solution for Bangladesh. Rice containing 400–500 percent more iron has been developed in the Philippines at the International Rice Research Institute. A well-designed study showed that the rice has the potential to reduce iron deficiency in non-anemic women (Haas et al. 2005).

Addressing the Gap

Bangladesh needs to address the gap between people's micronutrient requirements and their actual intake. Closing this gap will require identifying successful projects and then scaling them up. The major challenge may be designing a program that works in the face of extreme poverty.

Supplementation and fortification are interventions proven to alleviate deficiencies of iron and other micronutrients, both on a national scale in developed countries and on a pilot-project scale in developing countries. For any intervention to be sustainable, however, it must pass three tests: efficacy, effectiveness, and cost-effectiveness (Hunt 2002). Although supplementation and commercial fortification can cost-effectively reduce micronutrient deficiency, they have recurring costs and do not always reach the target population.

To combat iron deficiency, and the malnutrition of children and women more broadly, Bangladesh's Poverty Reduction Strategy Paper (PRSP) has underlined objectives for reducing severe protein-energy malnutrition of children under age two, low birth weight, stunting, low BMI for women of childbearing age, and geographic disparity in child malnutrition (GOB 2005). It aims to achieve these objectives by adopting and expanding the National Nutrition Programme (NNP), Area-Based Community Nutrition (ABCN) services, and national-level nutrition services. In addition, Bangladesh will adopt household food security interventions that include popularizing nutrition gardens, promoting poultry production and consumption for nutrition, and encouraging collaboration of nutrition programs with the Vulnerable Group Development (VGD) program. It will also pursue a communication initiative to change behavior in eating, feeding, and other nutrition and caring practices.

Assignment

Your assignment is to recommend a government intervention to reduce iron deficiency in low-income people in Bangladesh.

Additional Readings

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